

Challenging Everyone

Dynamic Difficulty Deconstructed



Challenging Everyone

- Dynamic Difficulty Deconstructed
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Takeaway Goals

- Know how hard it is
- Recognize the potential



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Difficulty vs. Challenge

- Separate Difficulty from Challenge
- Challenge is personal



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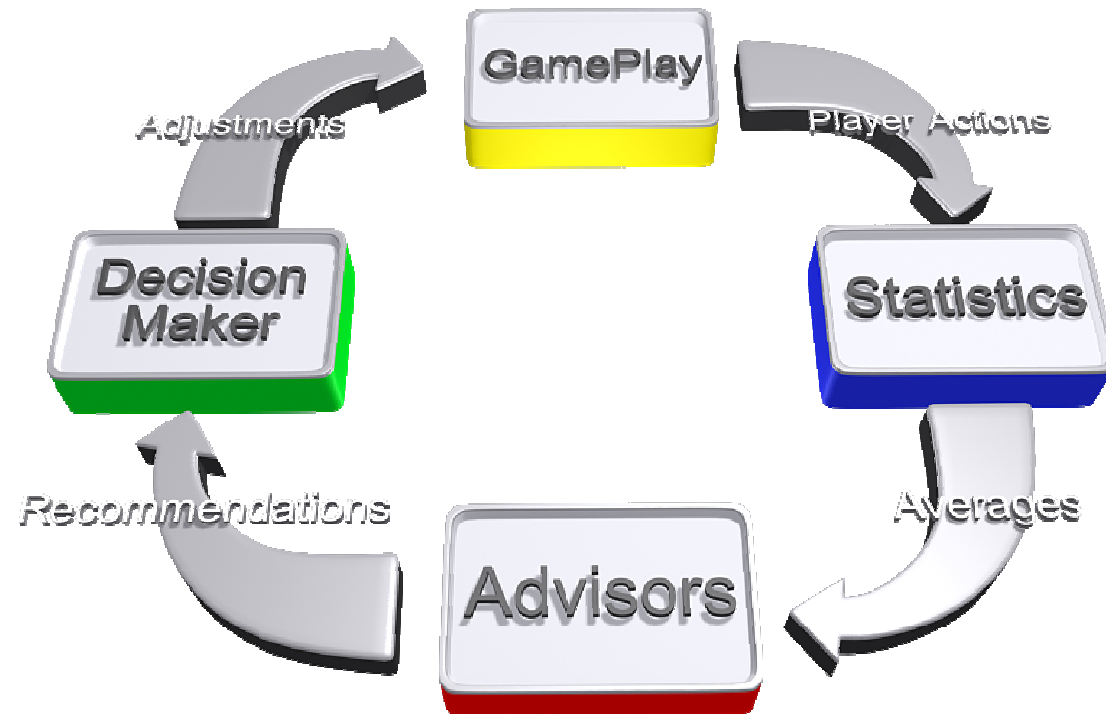
Demos



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High Level System Overview



Gameplay



- Game play variables for all kinds of game actions (number of enemies, types of enemies, health kits, helmets, accuracy, damage, etc...)
- Events generated for all player actions and a lot of enemy interactions

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Statistics



- Generic actions that the stats system monitors
- Short term vs. Long term



Advisors

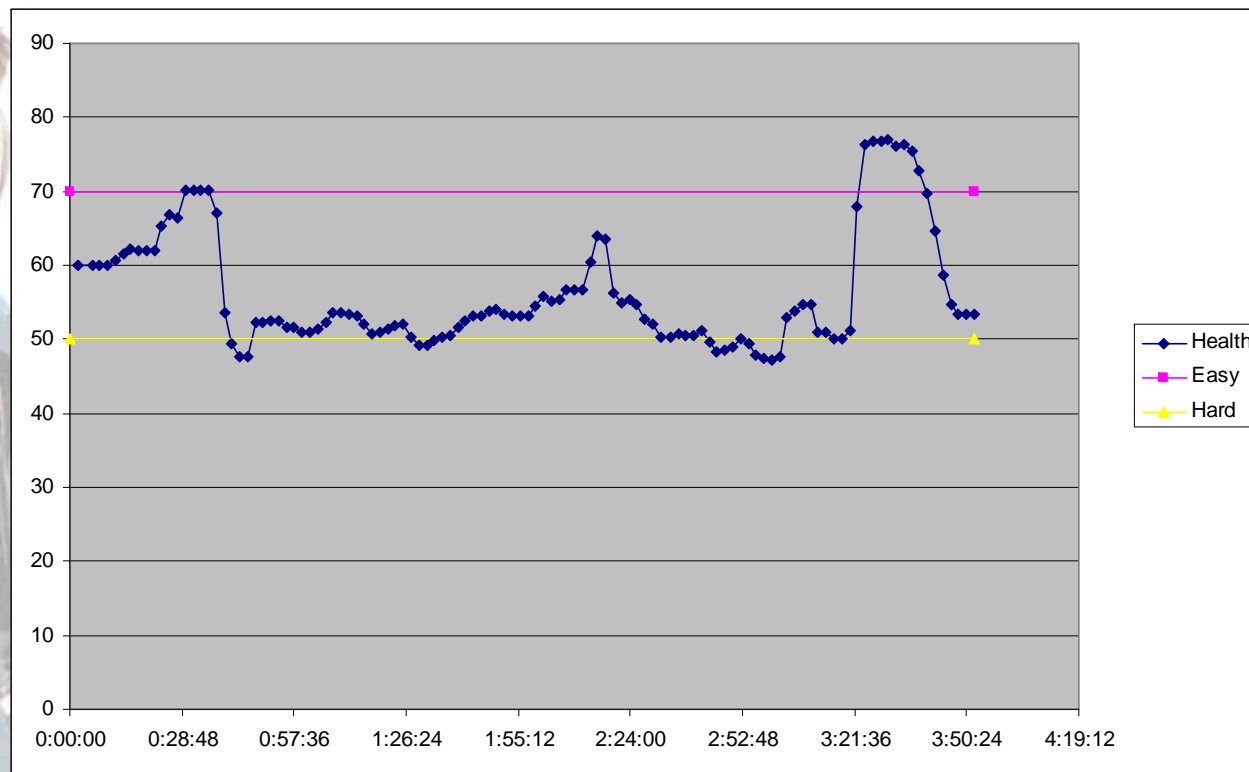


- Each advisor analyzes statistics and generates a score.
- Score is compared against thresholds to determine if the game is too easy or too hard (happy zone).
- Makes recommendations when unhappy (game is out of happy zone)

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Health Advisor Example



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Decision Maker

- Puts all recommendations from unhappy advisors into a pool.
- Changes game play based on decisions in the pool.

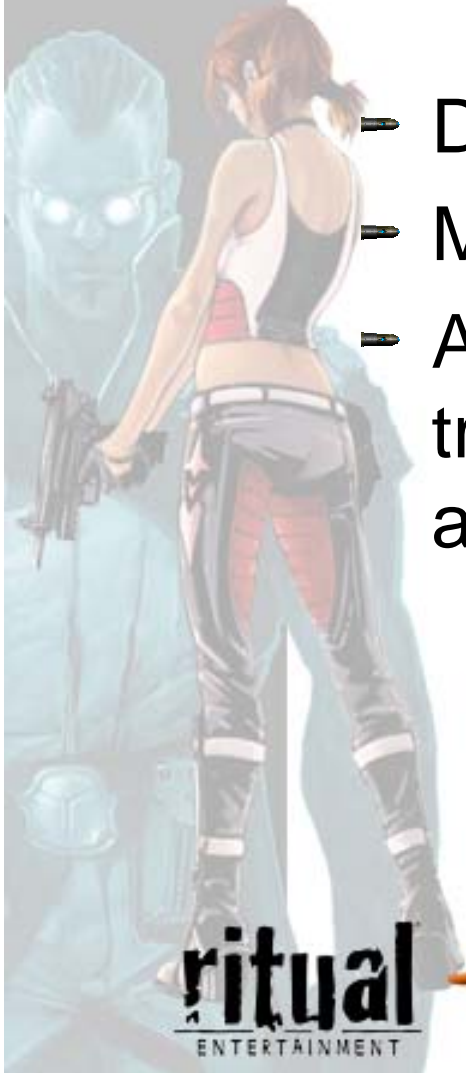


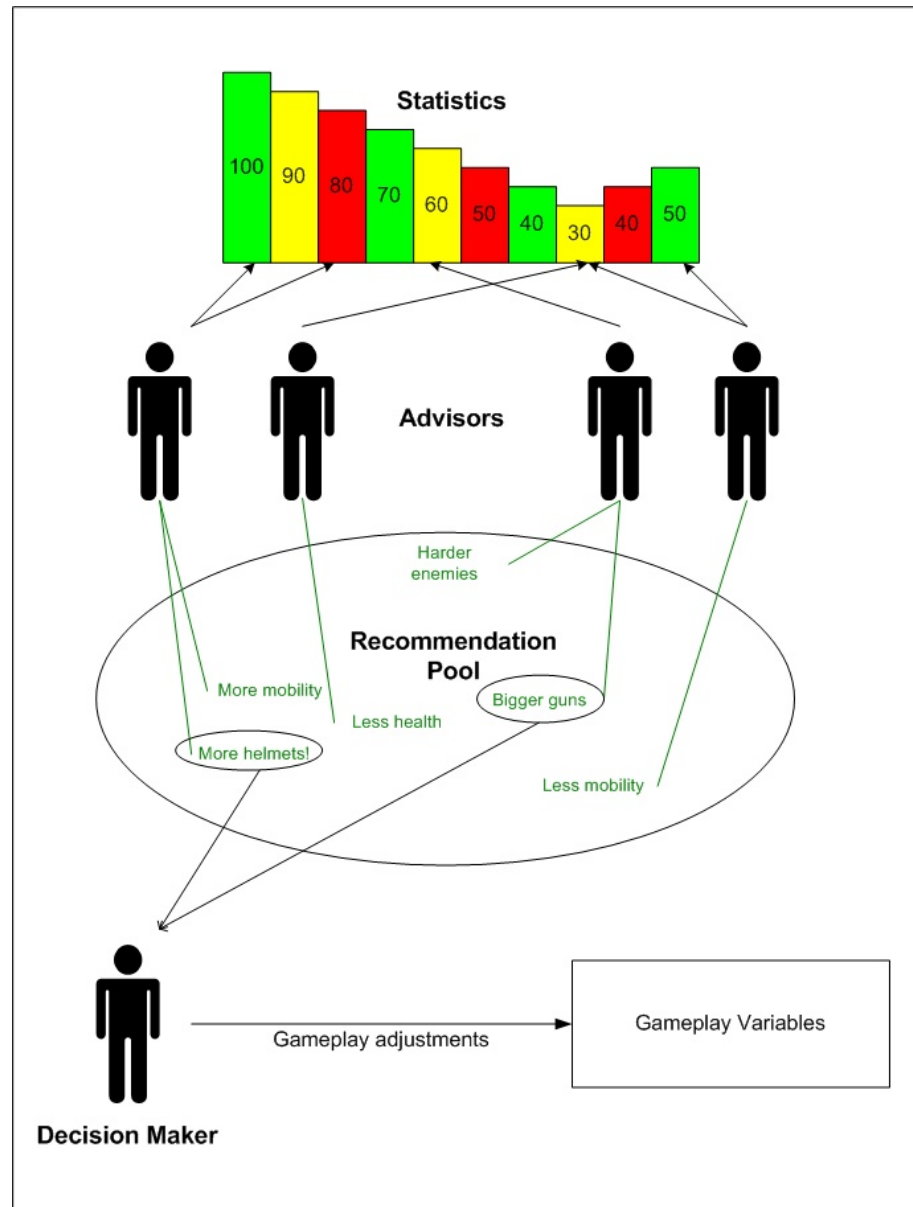
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Decision Maker

- Designed to change game play slowly
- Makes limited number of decisions
- Analyzes advisors decisions and keeps track of their success so decisions that aren't working won't get picked





Lessons Learned



Playstyles vs. Fun

- Headshots and helmets
- Game play variable min and max
- Game play recommendations advisors make should matter to them
- Moral: Don't challenge away the fun



Debugging is fun!

- ▬ Play tests
- ▬ Logs
- ▬ Difficult to determine.
- ▬ Moral: make sure to have lots of debugging tools.





STATS

General Weapons Levels Graphs Scores DD Debug DD History

Time	Advisor	Decision	Difficulty	Game	Game	Value	Value ..
00:04:00	Damage	Adjusting damage taken	Easy	0.59	0.04	17.17	-1.00
00:04:00	Damage	Adjusting NPCs firing rate.	Easy	0.09	-0.01	17.17	-1.00
00:03:40	Damage	Adjusting types of NPCs.	Hard	-0.50	-0.05	35.35	17.17
00:03:40	Health	Adjusting types of NPCs.	Very Hard	-0.46	-0.10	31.36	32.67
00:03:20	Damage	Adjusting damage taken	Very Hard	0.55	-0.10	42.42	35.35
00:03:20	Damage	Adjusting types of NPCs.	Very Hard	-0.36	-0.10	42.42	35.35
00:03:00	Health	Adjusting types of NPCs.	Hard	-0.26	-0.05	42.39	35.82
00:03:00	Health	Adjusting NPCs per spawn.	Hard	-0.35	-0.05	42.39	35.82
00:02:40	Health	Adjusting NPCs firing rate.	Hard	0.10	0.01	51.06	42.39
00:02:40	Health	Adjusting NPCs per spawn.	Hard	-0.30	-0.05	51.06	42.39
00:02:20	Damage	Adjusting damage taken	Very Hard	0.65	-0.10	71.72	57.58
00:02:20	Damage	Adjusting types of NPCs.	Very Hard	-0.21	-0.10	71.72	57.58
00:02:00	Health	Adjusting NPCs firing rate.	Easy	0.09	-0.01	85.97	67.24
00:02:00	Health	Adjusting health drops	Easy	0.42	-0.04	85.97	67.24
00:01:40	Damage	Adjusting NPCs per spawn.	Hard	-0.25	-0.05	31.31	39.39
00:01:40	Health	Adjusting health drops	Easy	0.46	-0.04	85.03	85.97
00:01:20	Damage	Adjusting NPCs per spawn.	Hard	-0.20	-0.05	34.34	31.31
00:01:20	Damage	Adjusting types of NPCs.	Hard	-0.11	-0.05	34.34	31.31
00:01:00	Headshot	Adjusting NPCs wearing hel...	Very Hard	0.00	-0.15	0.81	0.00

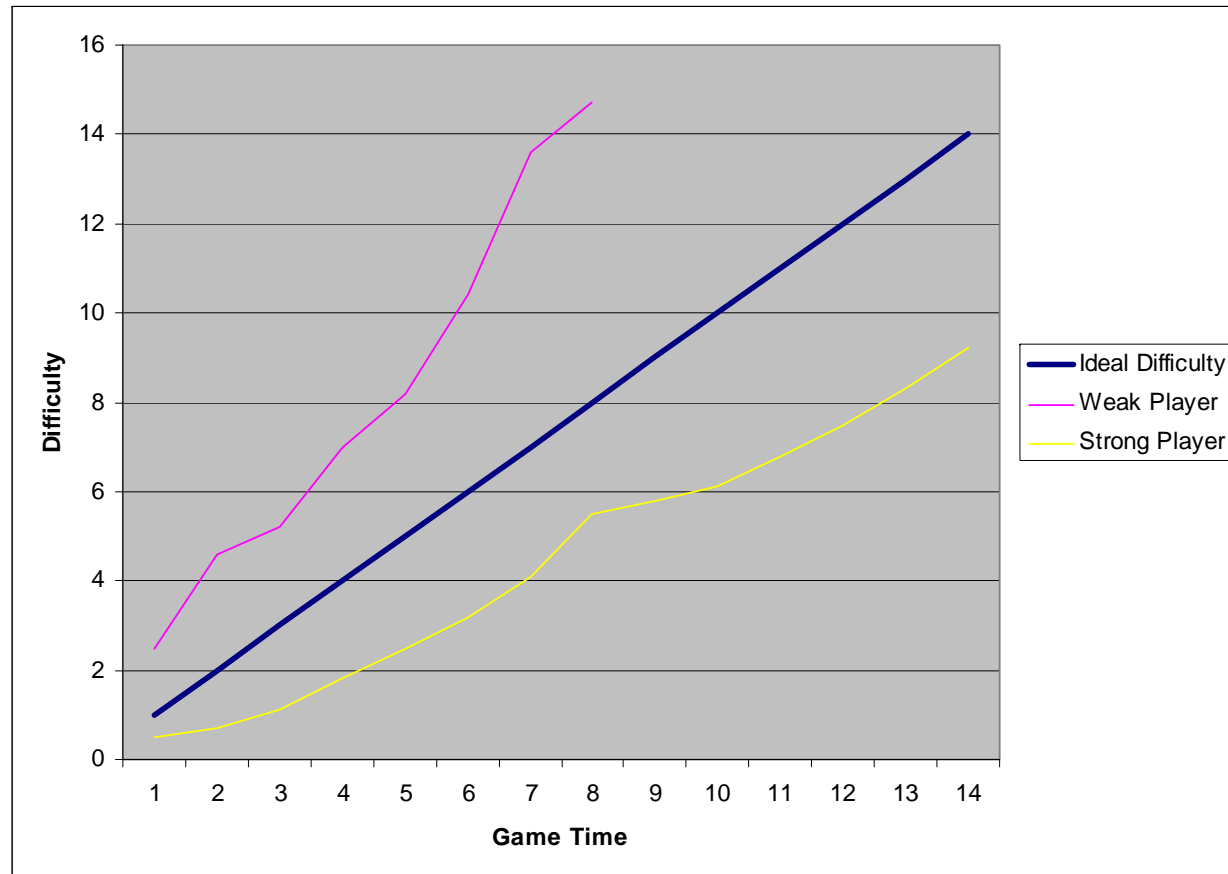
Save As Text

Skill: 64.39 Challenge: 24.46 HardCORPS: 4120

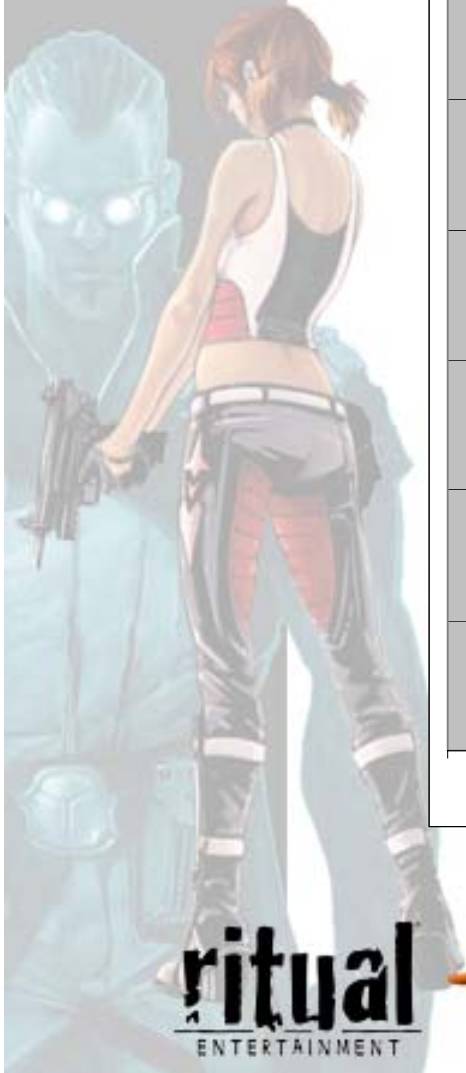
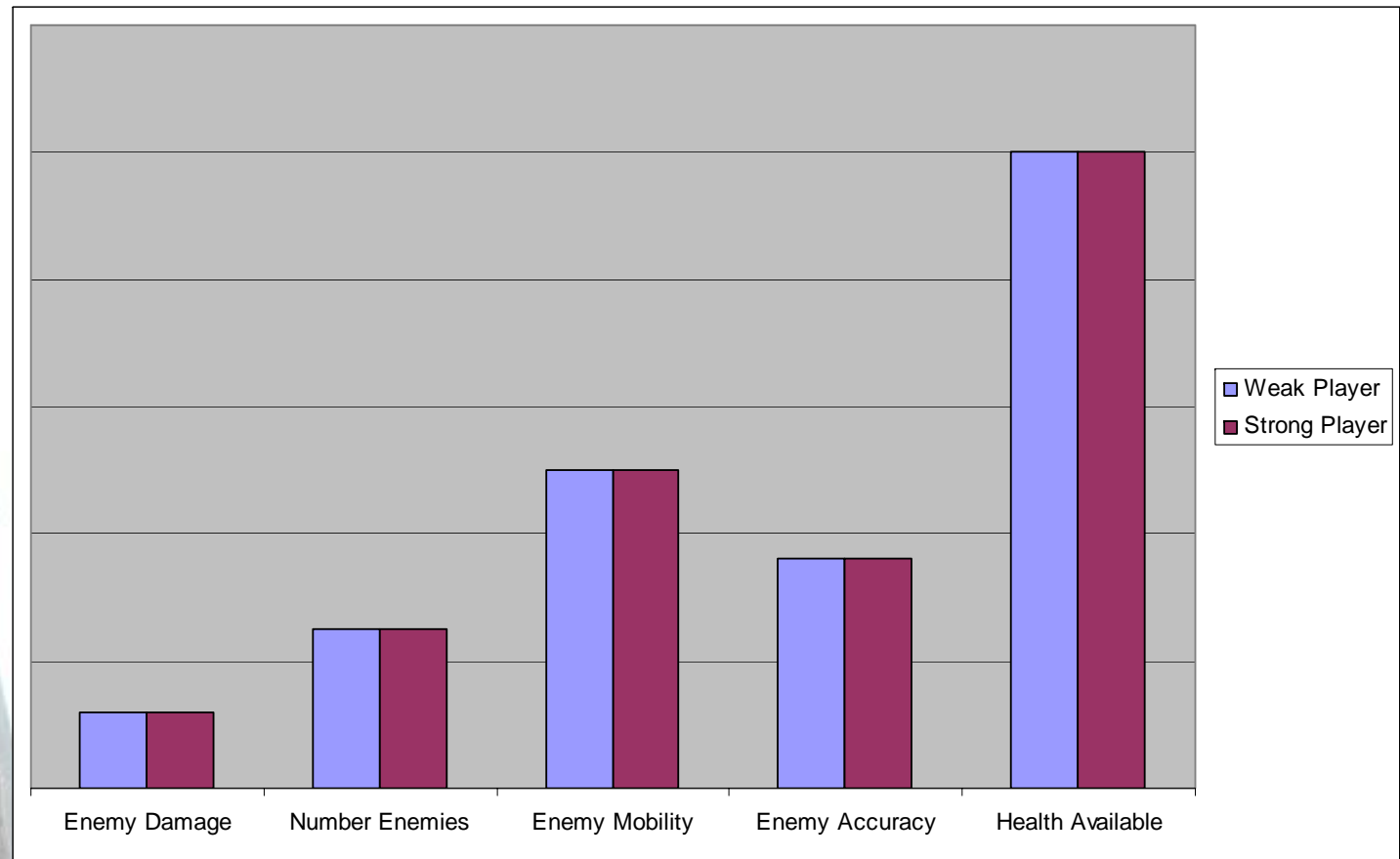
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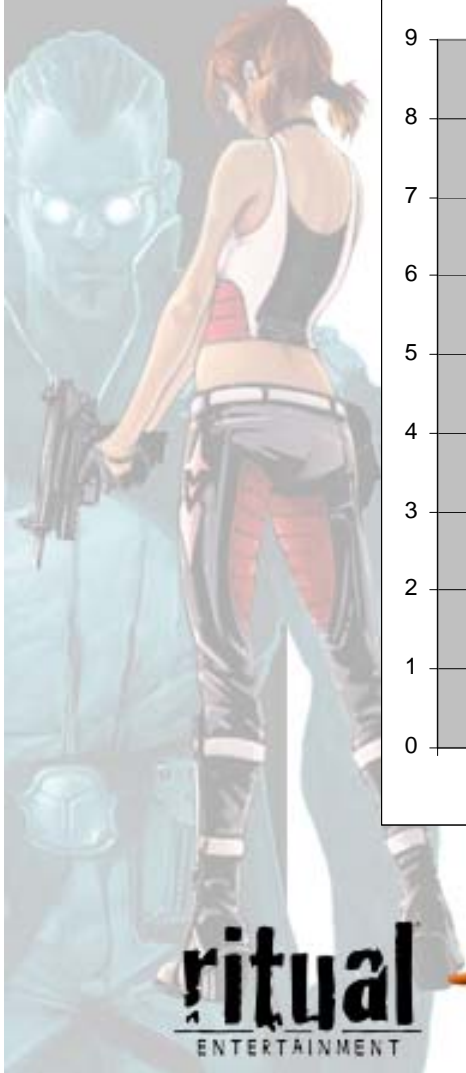
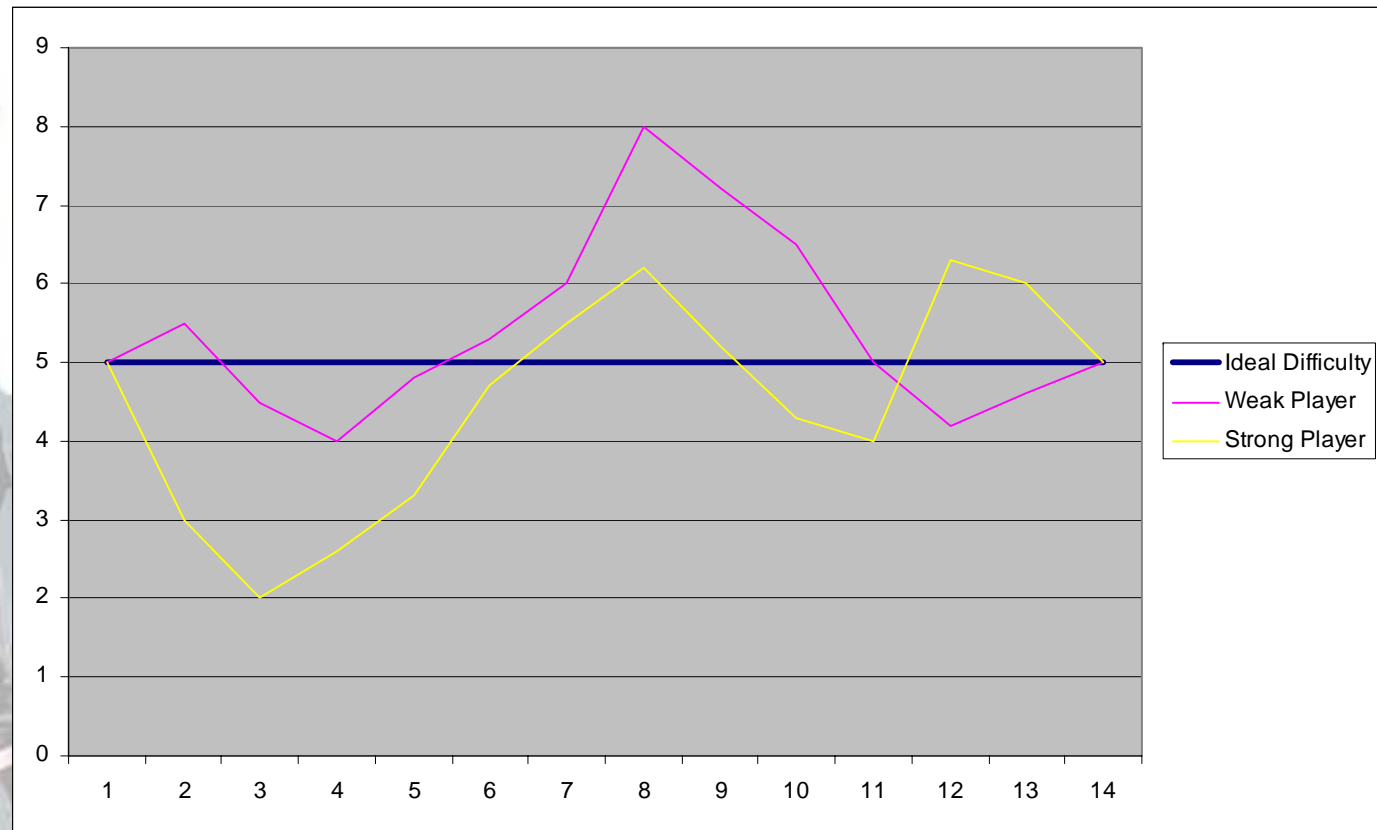
Traditional Difficulty - Challenge



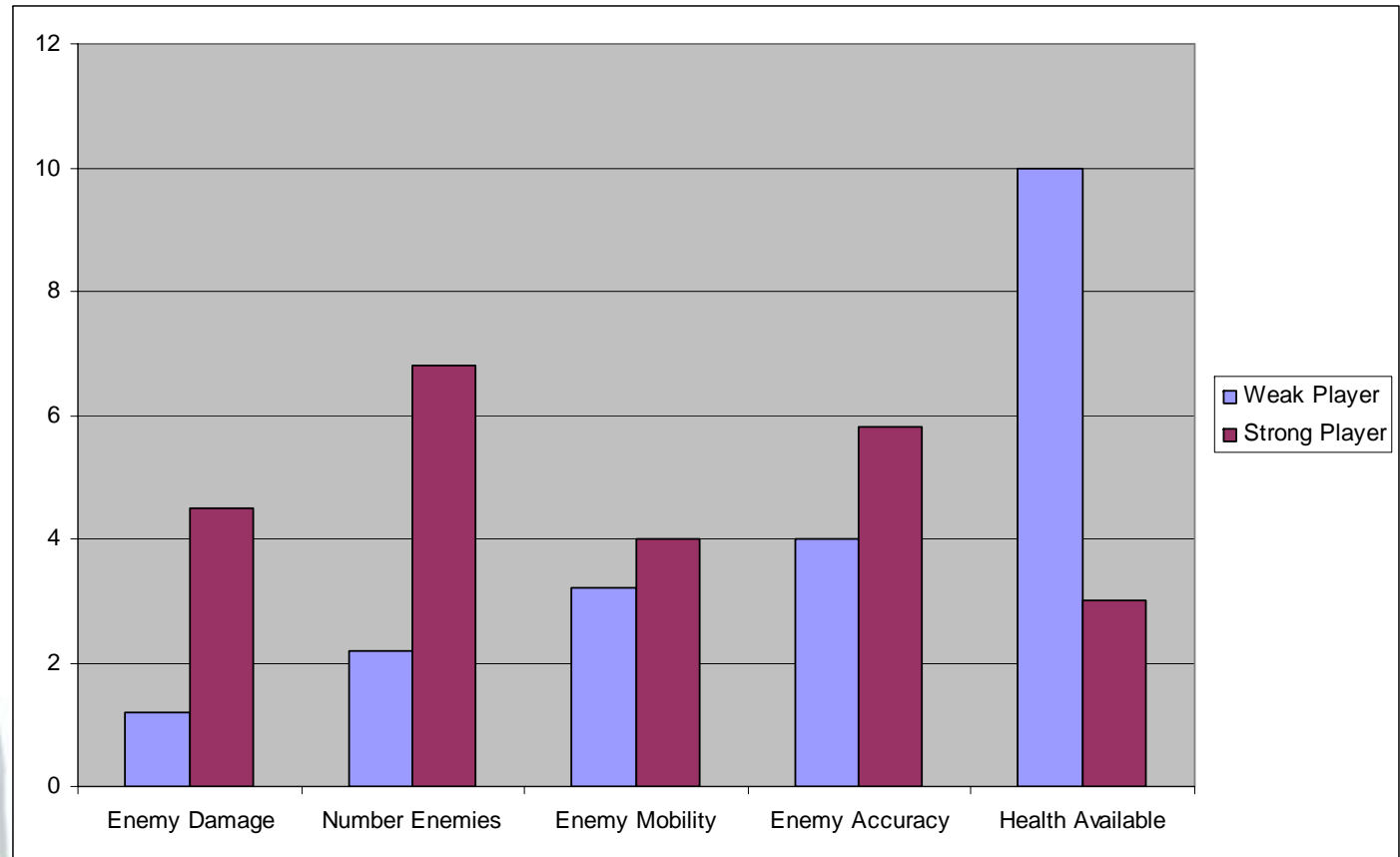
Traditional Difficulty



Dynamic Difficulty - Challenge



Dynamic Difficulty



Flailing System - Idea

- Players were hitting extremely hard areas and the dynamic difficulty system was not reacting fast enough.
- Why?



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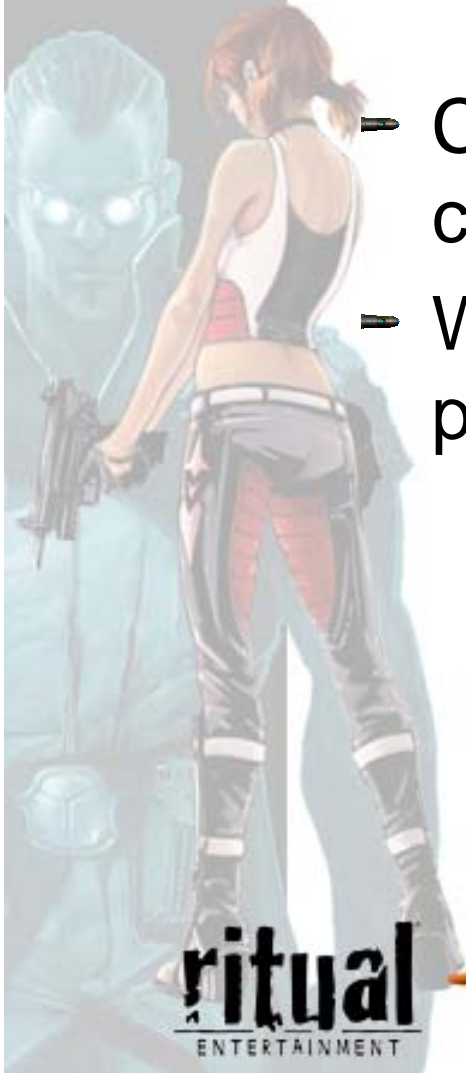
Flailing System – Attempt 1

- Traditional game design the issue.
- First Attempt
 - Adjust the game play variables easier based on deaths since last save point.
- Was still an issue with players that liked to save every two steps.



Flailing System – Attempt 2

- Change system to look at deaths within a certain time period.
- Worked for most cases but missed some playstyles.



Flailing System – Attempt 3

- Combine the previous two attempts.
- Still an issue with game becoming too easy after the hard area.
- How to fix this?



Flailing System – Ship it!

- Speed up the time in which the system makes decisions after flailing.
- Allows for faster correction.



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Player Control

→ One size does not fit all.



NEW GAME [X]

Challenge Level of personal challenge you want, once the system tunes to your abilities.

Casual [Slider] Extreme

Give Assistance Controls how quickly the system gives extra help if you are struggling in one spot.

Quickly [Slider] Never

☐ Upload Stats

Advanced Options - Unlocked After Beating the Game!

☐ HardCORPS Mode Disables all SAVING. You MUST complete the game in one sitting. Extremely challenging!

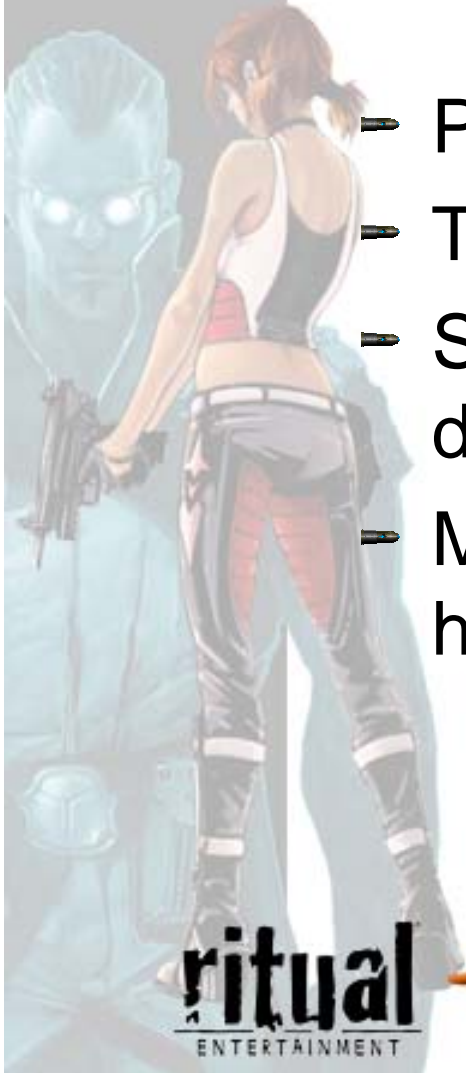
☒ Skip Intro Skips the introductory levels of the game.

[Start new game] [Cancel] [Restore Defaults]



Pacing Challenges

- Poor little Timmy
- Time-based advisor
- Some people weren't having fun but didn't communicate it
- Moral: Make sure the team can really tell how they feel



Benefits



Enjoyable game for a lot of players

- Hardcore vs. newbie
 - Players expressed they were sufficiently challenged
 - Women who claimed to hate first-person shooters told us that they liked our game because they could succeed at it.
- Players could control how hard of a game they got relative to them
- Less serious games felt that it adjusted to them, rather than the other way around



Replayability

- Arena mode
- Everyone on the team still enjoyed playing SiN Episodes at the end of the project
- Approaching 1 million stats submissions
- 1 year later, still 3,000 stats submissions per day
- Evidence players did replay the game just to see what would happen differently



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Balancing greatly reduced

- Super health packs
- System really worked
- Hard to convince traditional designers



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Awareness of gameplay implications

- Understanding play styles
- Understanding what makes play styles fun
- Understanding how people play your game

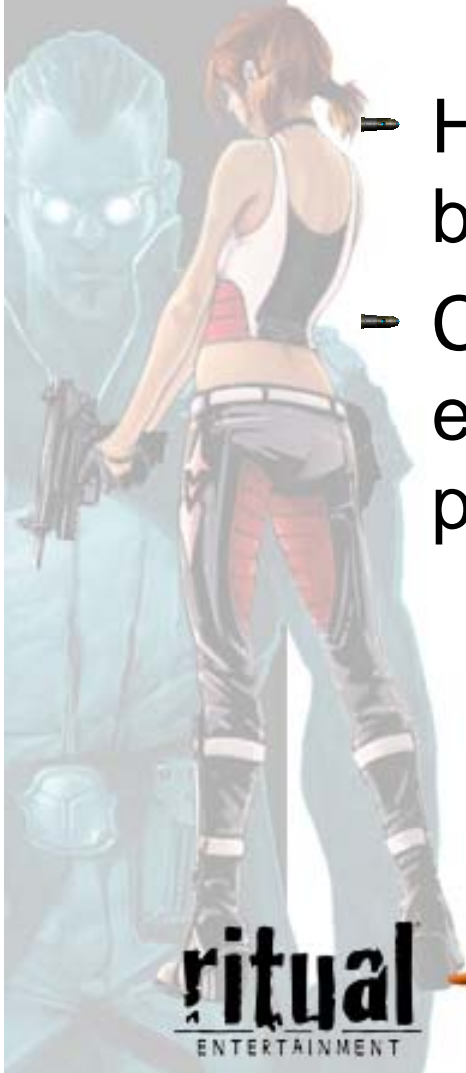


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Stats website

- Having all of these stats made it easy to build a website
- Collecting real stats from the community enabled us to know how people were playing our game post-release



Summary

- Double edge sword: Great benefits but took a lot of programmer time.
- Broadens audience
- Great for a series

